GRADIENT EVOLUTION

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Evolution, since the time of Darwin, has had a problem with mechanism and methods, though some think the synthetic theory, combining Darwin and the priest Mendel, provides the answer. The early Lamarkian/Darwinian view heritable traits gave way. Darwin's natural selection though persisted coupled with randomness and time, but usually “progress and anthropomorphic – intelligence” reasons for adaptation were applied, with Gould being a breath of fresh air. Lately creation scientists opposed to any "Godless" evolutionary concepts have like the evolutionist allowed anthrogenic concepts and intelligent design to allow themselves also the luxury of infinite (or nearly so) time and yet God. Within this paper a proposal for evolution of species is made for gradient mobilized or induced changes resulting solely from opportunity, occurring in a step function fashion in nature, by means of a filtered "multi-channel response of DNA (or the molecule") to the repeated opportunity. The method should have equivalent applications in populations, atoms, planets, or universes. The basic equations are:

Exploitation = 1 if $T > C/(VRN)$

= 0 if $T < C/(VRN)$

The basic requirements of gradient mobilized or induced evolution proposed are:

- opportunity needs to exist (opportunity need not be uniform, opportunity need not be durable),
- gradients need to exist in the opportunity (opportunity must be uneven - it may be that discontinuities in opportunities with infinite gradients or continuous opportunities with zero gradient are part of the gradient regimes possible),
- DNA must be a step function function of step functions,
- local and global opportunity exploiting functions need to exist (atoms, planets, molecules, individuals, populations, genes, channels) which give rise to step functions,
- at least a finite amount of time (that is there must be time for the evolution, organization to occur) with finite occurrence time,

- a locally temporally open system or apparently open system must exist (closed systems will be subject only to the law of disorganization),
- gradients in the opportunity together with the DNA enforce and conserve change,

Under these conditions change will appear directed, gradient will "directs" change and give the appearance of intelligent design, and random events will be largely ruled out. The principal causes of evolution will be seen to be gradient driven filter type step functions which will yield with absolute a new creature or new arrangement of the molecule, in a fashion that is stepwise and favors organization. Lamarkian, mutagenic, and other causes may be present, but will not be the mechanism of evolution. Purely Lamarkian, genetic drift, or purely mutagenic evolution will be largely ruled out but can play a role. The assumptions of a smooth DNA molecule, of uniformitism, and of the necessity of expressions are dismissed.

Experiments to verify the model are proposed to include evidence of cross species and inter family DNA equivalents representing globalization functions. It was proposed exploitation functions on the DNA are cumulative (that is skeptical), remain latent until there is a suitable new opportunity in which a DNA can be acted on by a global exploitation function, all of which steps require each other.

The globalization function may be internal to a cohort or be applied by means of an illness..

The model proposes that evidence of evolution is be found in a step wise continuous fossil record, and may or expected to be found in cross species globalization functions (depending on geography or time) exploited from illness (bacterial or viral) as remnants across a family of species or across many species. Cancer activation may then be a remnant or vestige of the time when the clonal populations of sexual species were still eternal asexual species. The tools for finding the globalization and step functions will be DNA sequence analysis across species.

1. INTRODUCTION

1.1 Model Background - A model is proposed for the means of evolution (with modification as well for galactic and other organization) implying that evolution (or organization) occurs under gradient driven conditions in response to opportunities for individuals and populations. The concept is a synthesis of ideas gleaned from readings in T.C.R. White's book "The Inadequate Environment" (1) , Jacob Etringers book "Foolish Faith", (2) David Quammen's book "The Song of the Dodo" (3), Carl Sagan's book "The Demon-Haunted World" (4), S.J. Gould's book "Wonderful Life" and (5) O. Sach's "Islands of the Color Blind" (6). This model of origins is to address the issues raised in some quarters, and not properly met in my opinion t, that evolution is a random process or an intelligent design process.

1.2 Disparate Solutions - The question of origins of life has resolved on two apparently disparate courses, namely evolution and special (or limited) creation. Neither would seem to be imminently repeatable by scientists any time soon in a laboratory. We can not reproduce the past 15 billion to 30 billion years of the universe (Van Egmond, 7) nor can we command a special creator to make us a new atom or moon just create to satisfy our ignorance.

1.3 Creating Complexity - Science can postulate, but the observer must choose his truth or poison as the case may be. If science is about uncovering the truth, it is the book of truth entitled "Creating Complexity When Chaos just won't do" we are uncovering. I do not expect on one hand a creator to have written a book of formulae for us as though we were children, neither do I expect the book which lies before us in plain view to be locked beyond access given a key in our hand called "Existence". The book is known, the key is useable, now we are just picking the locks, testing the tumblers, and turning the pages.

1.4 Evolution - Texts including discussions on evolution contain references to moths (now some what in dispute), to primate fossils (also somewhat in dispute), bacterial resistance (some dispute as well), and the fossil record with a paucity of intermediate forms (some dispute that as well), mutagenicity, selection, and so on (8, 9, 10). Even Lamark, long in disrepute, has it seems to me been vindicated, at least partly, by the recent finding that there may be bacteria which pass on new or old genetic material from other sources (i.e. environment around them though they still do not have a long neck).

1.5 Special Creation - Special Creation and its new brother Intelligent Design require a being more powerful than human beings to be in charge. It seems to me though that such ideas about the truth in science, truth in fossils, and the like are dismissed or redefined to nothing, and in fact the concessions of science and musings of the scientists (who speak of impoverishment of their concepts) are extracted like quotes from sacred texts. One can readily agree if there were one Star Trek being like Q (11) then special creation or intelligent design would be no problem. Similarly one can readily agree that if there is no higher being, then it seems at least plausible humanity is the most intelligent being in the universe, in which case we may as well consider ourselves God. God is alive, or God is us, Long live God. God discussion is for another work, herein I examine how one, as God or human as the reader would have us be, can model evolution to generate new species.

1.6 Problem of Past Theory - The problem with past models of evolution is that they have not provided a "mechanistic" scientifically verifiable model for evolution occurring or for being able to produce "laboratory conditions" for new species to occur, not for increasing organization. It is the postulate of this paper that evolution can occur and with proper design evolution could be made to occur or observed. Honest scientists in both the evolutionary side and on the special creation side, have fallen for hidden assumptions and miss the evidence and can not form the experiment. Multiply radiation-bombed fruit flies rather than representing either evidence of evolution or the stability of the DNA, may rather show a step function introduction with an incomplete mobilization filter.

1.7 Pinnacle Problem - Both the evolutionist and the creationist (or intelligent design) see the steps leading to some human pinnacle (whether that is complexity or that complexity being humanity). The evolutionist sees almost anthropomorphic reasoning in the acquisition of new talent, perhaps a latent defect left over from Darwin's Victorian homeland, while on the other side the pinnacle seems to be the measure of

perfection rather than an outcome of the perfection. It could be that Gould's luckiest individual as the "winner" suffers not from the pinnacle, just from pride.

1.8 Modeling Evolution - A procedure to model evolution and test the theory for describing the origins of humanity and hence all of life on earth is proposed. To do so, the basic tenets of science are laid out. It is proposed that the theories and models that are "true" or "become true" to any scientific frame work describing reality must meet the conditions of Table 1.

Table 1 - Scientific Framework Models

Increase in inclusion and understanding of the outlying data
Demonstrate an ability to explain or incorporate older or other theory
Have in at least the physical sciences an existential basis
Have in at least the physical sciences a basic mathematical description
“Support and not contradict” the "data"
Is ready at any time to be discarded for the better model
Except for absolute experiments must not be magical
Except for absolute conditions must be must meet and support the data
At certain existential absolutes must be accurate
Shall at all times be able to be improved upon (that is discovery is never at an end)
Shall not be confused with reality
Shall be comfortable in any ontological model

1.9 Gradient Model - In this paper is proposed a gradient based model of origins and evolution, gradients in the presence of the step function called DNA. Models that have been considered by others include those in Table 2.

TABLE 2
Origins and Evolutionary Models
(if not attributed see common texts)

Lamark - immediately inheritable traits
Darwin - Survival of the Fittest
Gould - Survival of the Luckiest
Dobzansky - Survival based on genetics
Mutations, Gene Flow, Genetic Drift, Small Population, Loss of genes,
Mating preferences, ecosystem pressures (Lamark right over the long haul), divergent, convergent, etc.
Creation Scientists - Instant Generation (example: Jennings, Scopes Trial)
Intelligent Design - Design and evolution to purpose (Paley, Dembski)
Special Creation - Moses
Gradient - Van Egmond

1.10 Inclusion of Other Models - The gradient model does not require either random processes or intelligent design, but can live with both. The model is consistent with observations of both random processes and intelligent design. Further the model points towards increasing complexity in the limited case of locally open systems.

2. GRADIENT EVOLUTION

2.1 Gradients - It is known that ants follow scent trails, that bacteria follow nutrient gradients, that chemical reactions follow concentration gradients. In the case of physical systems (for example combustion: combustion will "follow" oxygen and fuel to perform work) gradients are everywhere operative. A fire might even appear intelligent and directed. It is proposed that materials, molecules (including) DNA and life follow opportunity gradients, gradients that produce work, some of which leads locally to increased organization in the presence of appropriate step functions. Evolution is proposed herein to be a gradient driven process. Herein we will consider mainly life and changing complexity as one outcome of work along an opportunity gradient.

2.2 Opportunities - Opportunities (O) are either considered for simplicity may be exploited linearly (kn) or based on logarithmic type utilization methods (Ae^{kn}). Malthusian or Gouldian results may be the outcome for an individual or the population.

2.3 Inadequate Environments as a Model - In the presence of inadequate environments (F) such as described by T.C.R.White (1), gradients further exaggerate the Malthusian or Gouldian outcomes.

2.4 Utilization of Environments .The Utilization method is proposed to be a step function or multiple overlapping but unrelated step functions, preserved within and perhaps sporadically acting on the population or individual in the presence of a gradient. Mutations may be so detrimental as to reduce survivability under selection, but not in the absence of selection. Mutations may be preserved as a latent step function but the common song of non survivability should be likely be laid to rest in my opinion, as the mutation required to create or leave out an appendage for example is not likely a single DNA expression, rather mutations are for the most part hidden or unexpressed.

3. GRADIENT IN THE ENVIRONMENT

3.1 Simple Gradient Formula - In physics gradients are typically found or identified with liquid flow, heat flow, stresses, magnetic and electric fields and the like. In all cases laws (or better mathematical models) for such existential phenomena exist or have been derived, in one dimension generally taking the form

(1) $Q = Kx$, where Q is the quantity, K a constant, and x the field.

3.2 Opportunity Exploitation - for the simple model of the case where there is a bounded quantity of matter distributed among N packets of average volume V, which are captured in a linear or any other gradient at an average rate R for a finite time, then full exploitation can be only achieved when the volume of capture C exceeds the volume of the bounded quantity and the time is greater than the time for full capture. Excess exploitation and losses are taken and may be shown to be unimportant to the outcome if the other factors are sufficient. That is:

(2) Exploitation $= 1$ if $T > C/(VRN)$

$= 0$ if $T < C/VRN$

3.3 Global Exploitation in Steps - Thus a river will not flow until the lake is full and reaches the lowest point which represents a confining boundary in the presence of a gradient (neglecting losses for simplicity and clarity only). A series of lakes may not cause the largest flow or river until they locally exceed a locally global volume G, so that exploitation will require:

Global Exploitation $= 1$ if $\Sigma(\text{Exploitation})_i = 1$

$= 0$ otherwise.

4. BACKGROUND

4.1 Intelligent Design - The clock maker argument for the beauty and complexity of the planet and life is often used. It is not proposed here that the clock maker is the instant moment of creation nor the Planck time. Anyone finding a marble would know it was designed. But the appearance of organization is not proof of organization, conversely lack of organization is not evidence of random motion. At a macro level astronomical bodies move according to set laws based on past causes, but under fractal conditions may appear random or regular. But it is proposed herein, that the gradient in the presence of an opportunity of information is the cause of apparent design, the cause of organization.

4.2 Gravity - Near an object the velocity gradient is designated "g" while force varies as r^2 the local gravitational acceleration. In this case, the outcome and interaction of masses approaching the object, were described by Newton. The outcome of repeated collisions is a sphere, for example a sphere called earth is round. Any sphere in space, any bubble in the air, in the water is round and appears intelligently designed, just as a marble on the beach appears intelligently designed. It is the case though that the earth and bubbles, follow a gradient law to formation, it is that the witness to the clock is biased.

4.3 Fractal Perspective The earth is the sum of many independent collisions (in the presence of a gradient) whose result demonstrates order from chaos in only a fractal sense (that is in a fractal perspective). It is a gradient driven process of certain outcome in the presence of time and opportunity. It is statistically 100% likely the material forming the earth should have made a “round” earth even if it all entered the sphere from a single direction. A block or pyramid would have been the surprise. It is statistically certain that the matter and energy organize in the presence of gradients.

4.4 DNA - It is proposed herein that matter and life $DNA^{(x)}$, of length x, is a step function of quantized data. In the presence of inadequate environments and opportunities with nutrient gradients or any other gradients will organize to complexity in locally closed (that is gradient enclosed) environments. Organization must and will occur to for promote at least one Global Utilization in many cases in local bounded environments. As long as there is an inadequate environment, local global opportunities, a step function capacity, a collection of data or skepticism function capability, whether environment, or DNA molecule, or other factor, there may be or will be organization.

4.5 Time - The model shows a time, size, opportunity dependent step function. Gradual and rapid evolution and organization may occur, but step or jump evolution is expected. "Intermediates should not arise" although latent intermediates may be possible) to exploit opportunities. The change in the DNA or utilization of the Opportunity (O) will follow the laws of physics and chemistry. It seems likely that geologically speaking from the fossil record and chemically speaking from physics and quanta, that for speciation and despeciation jumps or discontinuities are likely the norm. The step function proposal for the DNA data function supports speciation in jumps, with possible variations in the jumps and speciation.

4.6 Step Function - It is proposed that evolution is a definable process based on the step function discontinuities in the DNA, as well as the consequent ability in the presence of gradients to exploit opportunities. There are proposed to be principal a number of modes of evolution, of which two are herein considered.

5.0 EVOLUTION

5.1 Evolution Modes - Mode 1 evolution is proposed to take place in the presence of no or low gradients and large populations (population size which mitigates against dramatic changes but which incorporate many variants on the basic DNA) where time is available to allow DNA to change, this being the older model, the model of natural selection. In Mode 2 evolution is proposed to take place in the presence of gradients, of low populations, of a stepped or non smooth DNA molecule, and an opportunity. In Mode 2 the time to incur change will depend on the size of the opportunity, the gradient, variability in the DNA, the number of new DNA steps that appear, and the number of latent DNA data units. It is expected that Mode 1 evolution, requiring time, was a wrong model based on the assumptions of a) uniformitism (from geology), of b) a smooth genetic carrier (function) molecule, and of c) that ability to express means expression must be occurring.

5.2 Mode 1 as a special case of Mode 2 - It is posited here that Mode 1, is at all times on the boundary of Mode 2, and may even be a corollary to it.

5.3 Mode 2 as Predominant Mode - All but clonal populations are proposed to be populations of Mode 2 populations. It is clear that Clonal populations, where asexual reproduction occurs (bacteria for example), speciate each time a new or existing DNA sequence is continuously exploited in a population. The production of a new flu each year is evolution in action, evolution in steps without intermediates.

5.4 Hetrogeneous, DNA as Unique -For other populations it is posited that it is wrong in biological sciences, as in other physical sciences, to treat the population as homogeneous and isotropic both in terms of DNA and opportunity, even though such assumptions are reasonable starting points.

5.5 Samples of Hetrogeneity - A theory of gradient induced evolution in the presence of quantized unique individuals or DNA is proposed. Experiments to verify the model are proposed to include evidence of cross species and inter family DNA equivalents representing globalization functions.

5.6 Skepticism - It was proposed exploitation functions on the DNA are cumulative (that is skeptical), remain latent, until there is a suitable new opportunity in which a DNA can be acted on by a global exploitation function, all of which steps require each other. The globalization function may be internal to a cohort or be applied by means of an illness. Mutations are allowed.

5.7 Smooth DNA Disallowed - The assumptions of a smooth DNA molecule, of uniformitism, and of the necessity of expressions are dismissed. The evidence of evolution must be found in a step wise fossil record. That is the type of record found. Further evidence of stepwise evolution may or expected to be found in cross species globalization functions (depending on geography or time) exploited from illness (bacterial or viral) as remnants across a family of species or across many species. The tools for finding the Globalization and step functions will be DNA sequence analysis across species.

5.8 Cancer - Cancer activation may then be a remnant or vestige of the time when the clonal populations of sexual species were still eternal asexual species.

5.9 DNA as Skeptical Function - A theory of gradient induced evolution in the presence of quantized unique individuals or DNA is proposed. Experiments to verify the model are proposed to include evidence of cross species and inter family DNA equivalents representing globalization functions. It was proposed exploitation functions on the DNA are cumulative (that is skeptical), remain latent, until there is a suitable new opportunity in which a DNA can be acted on by a global exploitation function, all of which steps require each other. The globalization function may be internal to a cohort or be applied by means of an illness. Mutations are allowed.

5.11 Absence of Homogeneity in Populations - A consciousness of the absence of homogeneity may be ascertained by considering dandelions in a field, or moths on plants (T.C.R. White), or the DNA sequence of the individuals of a population. The individuals are similar but unique. Except for twins (and similar clonism in sexual populations) it may be shown considering DNA that all populations are individuals. It has been found for moths for example that "adult moths are "**programmed**" to lay their eggs, and their caterpillars to feed upon, only one or a few of the many species of plants in the forest" (TCR White). This remarkable statement is evidence that species are unique because their originating individuals (programmed emphasized by writer) exploited an opportunity in the presence of high opportunity gradient. Programmed implies evidence of anthropomorphic attribution.

5.12 Asexual Populations - Asexual reproduction of self cloning is perhaps the only population of DNA homogeneity, but such DNA lives forever. In this case some clonal populations sacrifice "eternal" life for the benefits of sexuality and organization. In this case the clonal information survives statistically by producing at least if possible two offspring. A multi-cellular organism remains to the end of its life a community of genetically identical individuals (clones) with distinctive roles, a community of cooperating clones The exploitation by identical DNA of various resources is evidence of exploitation of latent step functions within a population. In sexual DNA, cancer may be a "mature" reapplication of the latent step function of an existing step function in the "originating" clonal DNA, a remnant of a long forgotten clonal past or multiple forgotten pasts.

5.13 Mutations too Gross but Useful - Further it is posited that mutations are too gross a tool for evolution as a rule, but that at a microscopic level mutations are but one tool to provide changes in small quanta (in discrete packs) of DNA, and these changes or quanta (or steps) of the DNA that can be sufficient. In a healthy population of individuals DNA is not identical or homogeneous. A DNA population can be healthy is yet thoroughly heterogeneous, thoroughly composed of individuals. DNA for a given cohort of the population may be identified as DNA^c but even within that cohort will be individuals.

6.0 DNA AS DATA

6.1 DATA - Just as changing just the use of one word or one space between words in this paper, will not in general dramatically change the content or meaning as a rule because of context correction, yet it may. It is proposed further that the DNA quanta are potential or actual information, used, unused, or unusable. It is proposed changing a small quanta in the total quanta of a system of quanta (the information quanta or work quanta), may allow a new understanding of the same information. For example in a thousand page text changing one letter of text, or one rule, may change the outcome, but even then the change may seem so minor and not to impact the outcome. Consider for example:

- " John Built is Home" and "John Built his Home". Adding one quanta may radically change the title and expected content of the text (without doing so),
- " John, please move" and "JOHN,PLEASE MOVE". One quanta of capitalization rules may change the urgency of the information.
- "Go to…. (3 Queen Street, 3 Regina Street, 3 Highway 3, Wallace's Pet Shop)". Different expressions of the same information for one quanta related to operations, with no change in outcome.
- "Step 4, place the chicken in the microwave and cook for 45 minutes. Step 5 remove the tin foil cover" and "Step 4 remove the tin foil cover. Step 5, place the chicken in the microwave and cook for 45 minutes" . One change of quanta results in a different outcome. In one case cooked chicken, in the other case cooked oven.

6.2 Small Change may Change Outcome - It can be seen that minor or major changes in the quanta may result in vastly different outcomes or identical outcomes. The information may in fact the same, its expression and outcome can be but need not necessarily be different. Eventually though, careful reading of the information, that is reading the information in the presence of an opportunity with a gradient, will (or may) produce only one outcome regardless of the reader. Even identical materials, read at different times or by different methods, may result in different or identical outcomes, for example reading Hamlet at age 15 may bore you but at age 45 inspire you. The quanta in the DNA data stream may seem unused and to be junk, but given the right reader, a Latin paragraph in an English text may still say "Seize the day" or a book's 1500 pages summarized as "Lighten Up".

6.3 Step Function - The quanta, may be a specific piece of data such as a letter, or rule such as a rule of capitalization, a rule of multiplication, etc. but whatever the quanta, it is proposed herein to be considered a classical step function, which is zero (0) before implementation and one (1) there after. That is:

(3) F(DNA) = 0 before implementation
= 1 after implementation

6.4 Unique Step Functions - It is further proposed that a series of step functions F_n representing the various DNAq are unique and represent latent chemical expressions either utilized or potentially utilized. In this case there may be in total few or many quanta that mobilize or are mobilized at least once throughout the life of the individual, but only one new global Exploitation makes them available to the DNA^c cohort. Thus a single mutation, or thousands of them alone are not enough, there must be a Global exploitation.

6.5 Individuals - It is posited herein that a population though numerous or scarce, must be considered made up of individuals, DNA^c. Within a given population, individuals of a given DNA composition or expression (say light sensitive brown eyes) may be unique, rare or common, but in all cases it need not be at all true they are a large part of the population nor need it be true that they are isotropic, nor need it be true they are homogeneous even within the individuals, so that it is true that a population is truly made of unique but ubiquitous individuals, that is an individual may be thought of Sum of exploited step functions or I = Sum(F(DNAq)i to m).

6.6 DNA as a temporal not static Step Function - It is proposed that all individuals in populations of organisms each have a unique DNA make up (with asexual exceptions), which molecule creates a living biochemical experiment and laboratory, throughout its existence, and if the population is large enough experiments in the DNA use and data stream may be filtered to produce various outcomes. The $F(DNA^q)j$ may be junk DNA as it were, but on $F(DNA^q)i = 1$ the junk becomes useful.

6.7 DNA and Exploitation Functions - Given the size of the volume of Capture, the average rate of availability, the N packets of information available, and the volume of the packets, exploitation it was discussed will occur when the following are locally and globally true:

(4) Exploitation = 1 if $T > C/(VRN)$, or = 0 if $T < C/VRN$

Thus a species will appear when the global volume G is used or:

(5) Global Exploitation = 1 if $\Sigma(\text{Exploitation})_i = 1$, or = 0 otherwise.

6.8 Use of Opportunity - It is proposed when an implementation (filtration) function is imposed in the vicinity of an opportunity with an exploitation gradient DNA^q will exploit that opportunity depending not on time only, but also on the size of the opportunity, on the rate, and on the number. Note that if any of the rate, the packet volume, or the number is large or the C is small exploitation can occur, and that the exploitation will occur without intermediates. The absence of intermediates is expected to be an outcome of gradient driven step function initiated evolution.

6.8.1 Fossil Record - One would look to the fossil records for jumps in speciation, for discontinuities between species.

6.8.2 Illness or other Possible Global Functions - It may be further that in the presence of the quantization represented by the DNA and its skeptical function, that in the light of a "universal" viral or bacterial plague, a large part of the DNA experiments, that is species, may inherit the Globalization function at once.

- In this case one might expect experimentally to find unique pieces of DNA common in many species.
- Genetic drift may occur, but genetic bursts are more likely.
- It may be possible to parse backwards those new genetic globalization functions across many species, to determine which era or epoch differentiation and speciation occurred.
    - Given the discontinuous nature of the environment temporally and spatially, local variation can also likely be detected.
    - It seems reasonable that geographically and temporally such globalization functions should be found. For example all mammals and birds may at one time have inherited one globalization function for thermal control (an interfamial global function). Alternatively locally all vertebrates may have inherited a second globalization function (cross species) for nostrils.
    - Experimentally then DNA should show evidence locally (say on the Galapagos) confined globalization functions across a number of species (is more probable in a small local)
    - On a global basis other globalization functions should be evidenced in one type of species.
    - Birds and Fish may be expected to show more of the Inter Familial Global functions experimentally, while mammals, amphibians, reptiles, plants, etc. to show more of the cross species functions.

6.9 Inadequate Environments or Opportunities - For example taking Sach's "Islands of the Color Blind (6) and combining his observations with personal experience of sensitivity to light, one may posit reasonable that any one factor may make an individual rare or a subgroup of a population rare. Imagine a plant mite, living on the surface of a plant as part of a population. The mite exploits nitrogen from the plant, but having sensitive eyes (perhaps the Color blind DNA fragment or my light sensitive fragment) seeks out the shaded parts of plants with all like cohorts (though few in number). In this environment, nitrogen availability might be the opportunity, or light sensitive cohorts have like protection from aerial borne detection, from rain, from cold, etc. Each factor may be an opportunity which can be exploited by the like DNA cohorts but which remain part of the overall population. A table of such factors posited below provides the illustration for a new mite species (Table 3).

TABLE 3 - partial list of exploitation functions

Factor:	Exploitation	Global Exploitation
Light sensitive - live under leaf	1	0
Light sensitive - live under leaf protected	1	0
Light sensitive - live under leaf protected From drying out in dry years	1	0
Light sensitive - live under leaf, protect, moist Exploit senescing fruit in July	1	0
Light sensitive - under,protect,moist, July Fruit every July	1	0
Light sensitive - under, protect, July, yearly Virus	1	1

6.10 DNA as an Accumulator Filter - All the DNA "conspires" and collects and is "ready" for exploitation in the initial cohort population, but the light sensitive portion of the cohort may not exploit if the opportunity well is not fully exploited. One does not know what junk hidden in DNA remains diamonds just waiting to be mined. But once exploited in the presence of a gradient, the outcome has the appearance of both random occurrence and intelligent design

6.11 Filter as source for Developing Complexity - Under these conditions, in the face of gradients in opportunity and in the face of DNA^c quanta or steps, evolution is the filtered outcome, the filtered outcome leads to complexity. The directed portion will be the result of the gradients, the complexity the result of the filtering of the quanta $F(DNA^q)j+i$. =0,1, and the randomness the mathematics of fractalization of perspective. At all times DNA, and other molecules, by nature organize to minimum energy states, these states being quantized. That is entropy is being maximized by organization in the short term. Entropy only demands global loss of information, not that the local conditions should not locally or for a time lead to organization to decrease the demands of entropy. Locally planets are sinks that organize matter so that globally there is a larger entropy disparity.

6.12 Imagine a population of DNA^C cohorts of a larger population (P)of DNA $^{(\{P-C\}+C)}$ familial relations. In this case the population of DNA^C may be written:

$$(6) \qquad DNA^C = DNA\ (1-DNA^{\{P-C)}/DNA) = Sum^c\ (Sum(F(DNAq)i\ ))$$

Within the population of DNA^c cohorts are further populations of DNA^{ci} …., and so on, cohorts until only individuals remain in the cohort by parsing. That is, on parsing, an individual is the quantization $I = I(DNA^{\Sigma ci})$, the quantization being not only on DNA but on the life time biological and environmental (existential/experiential) condition. A male female pair is the minimum parsing that may occur for evolution to occur. Now all cohorts have a DNA for the original species while containing within that DNA many or few latent step functions for exploitation, but without a global exploitation function will not speciate. DNA will tend to conserve itself provided resources remain available, even as it speciates. The DNA will preserve much "junk" and much or the original DNA, not being an experiment in uniqueness so much as an exercise in "skepticism" even in the fact of opportunity.

6.13 Standard Conditions - In the presence of the Standard Opportunity (S) the entire population P will be under equivalent average pressure (P) to survive to the limit of the inadequate environment (T.C.R. White, 1) to reproduction. While White indicates the critical parameter is nitrogen, for evolution the inadequate environment may be almost any factor. It is expected then in the presence of the DNA step function, opportunities are varied and multiple.

6.14 Cohort Exploitation - In the presence of any new opportunity suitable or available only to DNA^C cohorts the entire population of interest will be only DNA^C and the familial relations may be "discarded" or find its own destiny but not being able to access a portion of the standard opportunity to DNA^c. At any time until a new species is formed, the DNA^C may remain part of the familial relations. DNA^c once a filter activates may then use O or modifications there too. As the opportunity remains a gradient remains acting as the filter. When $F(DNA^C)=1$ the two cohorts types split permanently. More than one species may emerge simultaneously (though this is thought to be unlikely) except for unique DNA populations (that is unique species may act in the presence of the same new filter becoming available).

6.15 Utilization - Imagine the opportunity available to DNA^C of individuals (I), to have a an opportunity volume of C, an average volume of v, a population value of N (=DNA^c) over time, where C is the total volume available over time, R is the annual or rate amount, and M is the number of years. Imagine that the opportunity has a time availability of T years. Each year imagine the individual DNA^C cohort is formed and may exploit the opportunity exactly once or for one period only (say spring budding of a flower, length of spring day, etc). Allow that each cohort dies each year (though a multiyear organism can be substituted). Now because DNA is a piece of information of discrete elements, discrete quanta, which comes available in quanta which constantly under rearrangement, except for a few exceptional cases (self clones and clones), on m combinations and combinations, where mutations are simply too gross and change, but where individual elements are part of the over all P population but expressed only in C from standard genetics it becomes true that the utilization is of the opportunity O is actually quantized, with the greatest opportunity for utilization being in the vicinity of the highest gradients.

Exploitation = 1 if $T > C/(VRN)$

= 0 if $T < C/VRN$

6.16 Series - Thus a river will not flow until the lake is full and reaches the lowest point which represents a confining boundary in the presence of a gradient. A series of lakes may not cause the largest flow or river until they locally exceed a locally global volume G, so that exploitation will require:

Global Exploitation = 1 if $\Sigma(\text{Exploitation})_i = 1$.

= 0 otherwise.

7.0 SUMMARY

7.1 Gradient and Step Function Theory of Evolution - A theory of gradient induced evolution in the presence of quantized unique individuals or DNA is proposed. Experiments to verify the model are proposed to include evidence of cross species and inter family DNA equivalents representing globalization functions. It was proposed exploitation functions on the DNA are cumulative (that is skeptical), remain latent, until there is a suitable new opportunity in which a DNA can be acted on by a global exploitation function, all of which steps require each other. The globalization function may be internal to a cohort or be applied by means of an illness. Mutations are allowed. The assumptions of a smooth DNA molecule, of uniformitism, and of the necessity of expressions are dismissed. The model proposes that evidence of evolution must be found in a step wise fossil record, and may or expected to be found in cross species globalization functions (depending on geography or time) exploited from illness (bacterial or viral) as remnants across a family of species or across many species. Cancer activation may then be a remnant or vestige of the time when the clonal populations of sexual species were still eternal asexual species. The tools for finding the Globalization and step functions will be DNA sequence analysis across species.

References:

1. T.C.R. White, The Inadequate Environment, Springer-Verlag1993.
2. J. Etringer, Foolish Faith, 2001
3. D. Quammen, The Song of the Dodo, Simon and Schuster, 1996
4. Carl Sagan, The Demon-Haunted World, Ballentine Books, 1997
5. S.J. Gould, Wonderful Life, W.W. Norton & Company,1989
6. O.Sachs, Islands of the Color Blind,
7. J.Van Egmond, www.egmondassociates.com, 2000.
8. P.H. Raven, et al, Biology of Plants, Worth Publishers, Inc. , 1986
9. H.Curits, Biology, Worth Publishers, 1989
10. R.M.Black, The Elements of Paleontology, Cambridge Press,1979
11. G.Roddenberry, Star Trek.
12. L.M. Prescott, et al, Microbiology, Wm. C. Brown Publishers, 1993
13. A.Pollack, Access Research Network,
14. H.Ross, Astronomical Evidences for the God of the Bible, web based (Creator Cosmos), 2001